

14 March 2002

CRUISE RESULTS
Fisheries Research Vessel Albatross IV
Cruise No. AL 02-02
Ecosystems Monitoring Survey

CRUISE PERIOD AND AREA

The cruise period was from 22 to 31 January 2002. The research vessel Albatross IV covered the Gulf of Maine and the northeast peak and shoal portions of Georges Bank (Figure 1). This filled in the area not covered for the Winter Ecosystems Monitoring Period during the Winter Trawl Survey.

OBJECTIVES

The primary objective of the cruise was to assess the impact of changing biological and physical properties of the Gulf of Maine and part of the Georges Bank portions of the Northeast Continental Shelf ecosystem which influence the sustainable productivity of the living marine resources.

Secondary objectives of this cruise were:

- the analysis of phytoplankton samples for carbon and nitrogen stable isotope ratios,
- collection of samples for zooplankton genome studies,
- the examination of plankton samples at sea for concentrations of Calanus finmarchicus to correlate with right whale sightings,
- 1 meter MOCNESS discrete depth sampling to study advection of this species into the Gulf of Maine.

METHODS

The survey consisted of 47 randomly distributed stations at which the vessel stopped to lower instruments over the side.

Key parameters which were measured included water column temperature and salinity, water column chlorophyll-a fluorescence at 31 stations, ichthyo and zooplankton composition, abundance and distribution;

along-track temperature, salinity, chlorophyll-a fluorescence and standard weather observations.

A double oblique tow using the 61-centimeter Bongo sampler and a CTD was made at all stations. The tow was made to approximately 5 meters above the bottom, or to a maximum depth of 200 meters, at a ship speed of 1.5 knots. Plankton sampling gear consisted of a 61-centimeter mouth diameter aluminum bongo frame with two 333-micron nylon mesh nets. A 45-kilogram lead ball was attached by an 80 centimeter length of 3/8-inch diameter chain below the aluminum Bongo frame to depress the sampler. A digital flowmeter was suspended within the mouth of each sampler to determine the amount of water filtered by each net. The plankton sampling gear was deployed over the port stern quarter of the vessel by means of a conducting-cable winch and a boom. Plankton samples were preserved in a 5 percent solution of formalin in seawater. Tow depth was monitored in real time with a Seabird CTD profiler, which was hard-wired to the conductive towing cable, providing simultaneous depth, temperature and salinity data for each plankton tow. A CTD profiler equipped with a fluorometer was used to provide water column chlorophyll-a fluorescence until the plastic fluorometer unit housing cracked on the 31st station.

Continuous monitoring of the seawater temperature, salinity, and chlorophyll-a level, at a depth of 2 meters was done along all of the cruise track by means of a thermosalinograph, and a flow-through fluorometer.

The thermosalinograph and flow-through fluorometer were connected to the Scientific Computing System installed in the laboratory area of the vessel by Atlantic Marine Center personnel. This system recorded output from the thermosalinograph, and the fluorometer every ten seconds, and gave the data records a time-date stamp from the GPS unit.

Samples for Seabird salinity data calibration were obtained on the 12-6 watch by taking a water sample from 30 or more meters depth using a 1.7 liter Niskin bottle at every fifth or sixth station. Calibration of the thermosalinograph and fluorometer from the surface flow-through system was undertaken on the 6-12 watch following the protocol outlined in the Ecosystem Monitoring Program Operations Manual. Ten water column and surface calibration samples were collected for the CTD fluorometer while it was operational.

Phytoplankton samples for carbon and nitrogen stable isotope ratio analysis were collected from the discharge water of the near-surface flow-through system. One thousand milliliters of seawater were pre-filtered through 300 micron mesh nitex gauze to remove most zooplankton, then filtered through a Whatman GFF glass-fiber filter and immediately frozen, for analysis ashore.

RESULTS

A summary of routine survey activities and estimated volumes of Calanus finmarchicus observed in the samples is presented in Table 1.

Figure 1 shows the areal coverage achieved during the cruise. The Albatross IV sailed at 1430 hours EST on Tuesday, January 22 and proceeded northeast through the Cape Cod Canal to commence sampling operations in the Gulf of Maine. The Albatross reached its first station, off of Boston, late that same day. The cruise track was conducted in a zig-zag northeasterly fashion, picking up offshore stations when winds were light, and heading inshore when winds and seas picked up. This strategy worked well in the northern Gulf of Maine but while heading south out of the Bay of Fundy the forecast of a large storm system with sustained very high winds in the 40 to 50 knot range forced the vessel to seek shelter in Yarmouth, Nova Scotia for 24 hours from Friday afternoon January 25 until Saturday afternoon, January 26. While in port the vessel attracted considerable interest among the local inhabitants, so in response to this the NOAA Corps officers and chief scientist took interested Canadians aboard for escorted tours of the vessel and sampling gear and a description of the work being conducted. The Albatross resumed its southerly track by late Saturday afternoon, covering stations on the far eastern portion of the Gulf of Maine and reaching the northeast peak of Georges Bank by Sunday morning, January 27. That same afternoon, one of the main drive engines had to be shut down, when its cooling water intake pipe burst along part of its seam. Although this was patched, it was decided to not run the engine unless absolutely necessary, so the cruise was completed using only one engine. Although this reduced the cruising speed of the vessel, the weather following the Yarmouth in-port continued improving to the point where it was flat calm and remained so for the remaining portion of the cruise. This allowed the vessel to cruise at sufficient speed to finish sampling the central and southwest portion of the Gulf of Maine, as well as the shoal area of Georges Bank, fulfilling the mission objective of supplementing the survey coverage that would be done during the Winter Trawl Survey. The ALBATROSS IV completed sampling operations on Wednesday, 30 January 2002 and sailed into Woods Hole via the Great Round Shoal channel, tying up at the NMFS dock on Thursday, 31 January at 0700 EST. This was one day earlier than originally planned in order to allow sufficient time for replacement of the broken pipe before the next cruise.

DISPOSITION OF SAMPLES AND DATA

All samples and data, except for the nitrogen and carbon isotope samples, the zoogen samples and the Calanus and CTD data, were delivered to the Ecosystems Monitoring Group of the NEFSC, Narragansett, RI, for quality control processing and further analysis. The nitrogen and carbon isotope samples were kept frozen and delivered to Rick McKinney at the US EPA Lab in Narragansett, RI. The zoogen samples were picked up from the vessel by Nancy Copley from Woods Hole Oceanographic Institute. The CTD data was delivered to the

Oceanography Branch of the NEFSC, Woods Hole, MA, and the Calanus data was forwarded to Patricia Gerrior at NMFS in Woods Hole, MA.

SCIENTIFIC PERSONNEL

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Table 1. STATION OPERATION REPORT FOR CRUISE AL0202

CAST	STA.	Date (GMT)			TIME (GMT)	LAT	LONG	DEPTH	OPER.
		mm	dd	yy	hr min				
									(b=bongo w=water z=zoogen v=vert cast C=carbon N=nitrogen (m) CO=Calanus observed+est vol)
001	001	1	23	01	02 54	4220.2	7037.1	66	b,N1,C1
002	002	1	23	01	05 23	4240.7	7019.1	91	b,CO 185cm ³
003	003	1	23	01	07 49	4301.5	7001.9	66	b,CO 106cm ³
004	004	1	23	01	09 31	4316.3	7012.5	109	b,CO 132cm ³
005	005	1	23	01	11 39	4331.3	6955.2	113	w

006	005	1	23	01	02 11	4331.4	6955.3	102	b,N2,CO 106cm ³
007	006	1	23	01	16 01	4259.0	6924.8	187	b,CO 370cm ³
008	007	1	24	01	06 18	4308.8	6903.1	168	b,N3,C2,CO 158cm ³
009	008	1	24	01	08 42	4313.0	6836.5	179	b,CO 396cm ³
010	009	1	24	01	11 08	4331.6	6852.6	142	w
011	009	1	24	01	11 17	4331.7	6852.7	137	b,CO 132cm ³
012	010	1	24	01	14 17	4356.8	6838.5	89	b,z1,N4
013	011	1	24	01	18 13	4325.7	6759.0	245	v
014	011	1	24	01	18 32	4325.8	6759.2	244	b,CO 317cm ³
015	012	1	24	01	21 10	4345.9	6741.8	232	v
016	012	1	24	01	21 27	4345.9	6741.9	233	b,z2,CO 158cm ³
017	013	1	25	01	0 49	4402.5	6730.1	211	b,CO 317cm ³
018	014	1	25	01	03 25	4420.9	6721.8	139	b,CO 158cm ³
019	015	1	25	01	14 40	4356.8	6654.0	151	w
020	015	1	25	01	14 50	4356.7	6653.9	150	b,CO 79cm ³
021	016	1	25	01	16 37	4341.6	6658.0	142	b,z3,N5,CO 53cm ³
022	017	1	27	01	0 09	4331.0	6623.3	79	b,z4
023	018	1	27	01	03 19	4304.4	6602.7	89	b
024	018	1	27	01	03 33	4304.6	6602.1	109	b
025	019	1	27	01	06 14	4242.9	6538.6	96	b
026	020	1	27	01	08 09	4228.7	6552.9	124	b,CO 53cm ³
027	021	1	27	01	11 01	4204.0	6604.3	95	b,N6
028	022	1	27	01	11 59	4148.9	6554.1	120	w
029	022	1	27	01	13 07	4148.9	6554.2	119	b
030	023	1	27	01	15 22	4144.0	6528.6	1852	v
031	024	1	27	01	18 54	4137.6	6558.8	102	b,CO 53cm ³
032	025	1	27	01	20 46	4125.0	6614.1	162	b
033	026	1	27	01	22 29	4132.2	6630.5	87	b
034	027	1	28	01	00 05	4143.9	6631.6	74	w
035	027	1	28	01	00 13	4144.2	6631.9	74	b
036	028	1	28	01	05 52	4158.5	6630.7	85	b,z5

Table 1. STATION OPERATION REPORT FOR CRUISE AL0202 (continued)

CAST	STA.	Date (GMT)			TIME (GMT)		LAT	LONG	DEPTH	OPER.
		mm	dd	yy	hr	min			(m)	(b=bongo w= water z=zoogen v=vert cast N=nitrogen C=carbon CO=Calanus observed+est vol)
037	029	1	28	01	05	55	4232.0	6624.5	219	v
038	029	1	28	01	06	09	4231.9	6624.5	222	b,CO 53cm ³
039	030	1	28	01	11	58	4258.8	6706.2	204	w
040	030	1	28	01	12	4	4259.0	6706.4	190	b,CO 53cm ³
041	031	1	28	01	14	37	4248.2	6727.0	238	v
042	031	1	28	01	14	55	4248.2	6727.3	240	b,CO 158cm ³
043	032	1	28	01	18	19	4222.4	6714.0	340	v

044	032	1	28	01	18 42	4222.8	6713.5	338	b,CO 79cm ³
045	033	1	28	01	23 08	4201.9	6702.3	62	w
046	033	1	28	01	23 17	4202.1	6702.4	68	b
047	034	1	29	01	02 37	4145.9	6704.6	60	b,z6,N7
048	035	1	29	01	05 04	4151.5	6723.8	55	b,CO 79cm ³
049	036	1	29	01	06 16	4142.5	6726.1	46	b
050	037	1	29	01	07 25	4134.2	6733.7	43	b
051	038	1	29	01	09 59	4149.5	6747.1	35	b,z7
052	039	1	29	01	11 12	4144.2	6756.1	31	w
053	039	1	29	01	11 17	4144.5	6756.4	31	b,N8,C3
054	040	1	29	01	14 24	4126.6	6748.6	36	b,N9
055	041	1	29	01	16 43	4137.1	6808.3	35	b,N10
056	042	1	29	01	20 57	4208.2	6815.8	194	b,CO 317cm ³
057	043	1	30	01	01 34	4244.2	6817.3	175	w
058	043	1	30	01	01 45	4244.5	6817.5	156	b,N11,CO 238cm ³
059	044	1	30	01	08 12	4158.2	6850.0	131	b,CO 185cm ³
060	045	1	30	01	13 03	4224.6	6930.5	249	w
061	045	1	30	01	13 21	4224.6	6930.7	245	b,CO 317cm ³
062	046	1	30	01	17 39	4211.9	6954.3	184	b,CO 343cm ³
063	047	1	30	01	23 00	4136.7	6914.2	167	w
064	047	1	30	01	23 22	4136.6	6914.2	166	b,z8,CO 317cm ³

TOTALS:	Bongo Casts	=	47
	Bongo Samples	=	94
	Water Samples	=	11
	CTD Casts	=	64
	Nitrogen samples	=	11
	Carbon samples	=	3
	Zoogen samples	=	8
	<u>Calanus</u> observations	=	27

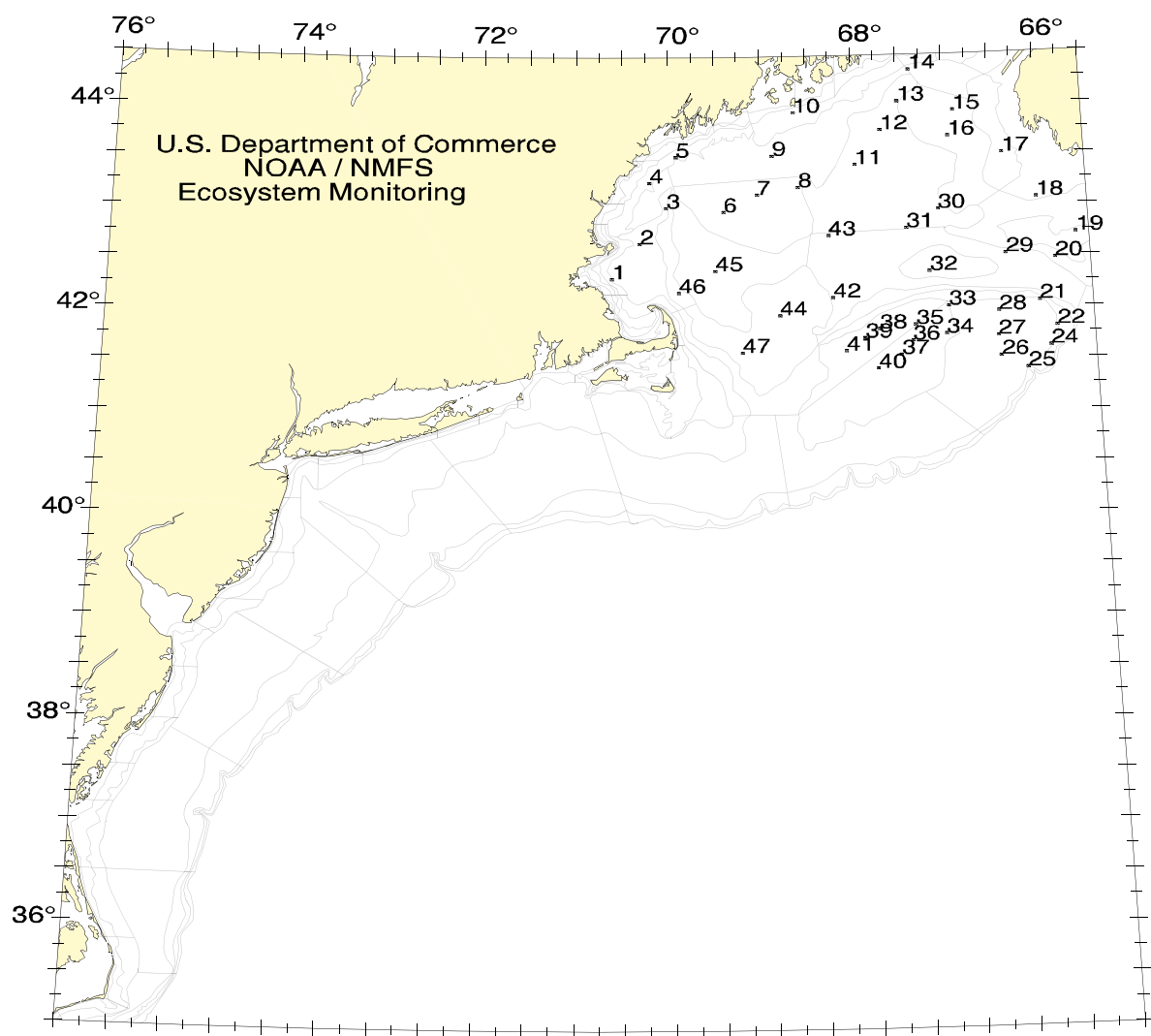


Figure 1. Station locations numbered consecutively for Winter Ecosystems Monitoring Cruise AL0202, 22-31 January 2002.